# High hormone levels in seabird chicks prepare them to kill their siblings

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Caption: An adult Nazca booby looks over the colony. Credit: David J. Anderson

The Nazca booby, a Galápagos Island seabird, emerges from its shell ready to kill its brother or sister. Wake Forest University biologists and their colleagues have linked the murderous behavior to high levels of testosterone and other male hormones found in the hatchlings.

The study appears in the June 18 edition of the online journal *PLoS ONE.*

The elevated levels of male hormones, called androgens, increase aggression in both male and female chicks and prepare the birds to fight to the death as soon as they hatch, said David J. Anderson, professor of

biology at Wake Forest and project leader.

Much of the field work was completed by Martina Müller, while she was a graduate student at Wake Forest.

"The older of two Nazca booby hatchlings unconditionally attacks and ejects the younger from the nest within days of hatching," Anderson said. Because Nazca boobies have difficulty raising more than one chick, it is important for the older chick to vanquish the younger one in order to increase its own chances of survival.

According to the study, the high hormone levels also cause the surviving chicks to behave like bullies after they grow up. They frequently seek out nestlings in their colony, and during those visits they often bite and push around the defenseless youngsters.

Blood samples were taken from Nazca booby chicks within 24 hours of hatching. In 15 nests with two eggs, blood samples were taken from both hatchlings. Samples were also taken from 15 hatchlings in one-egg nests. Then, blood hormones were analyzed by researchers at the University of Maryland, who co-authored the study. For comparison, the researchers did the same for blue-footed boobies, a closely related species.

The researchers suspect that the Nazca booby hatchlings experience the high level of aggression-related hormone during a "sensitive period" in their growth, when long-term growth patterns are easily affected.

Some Nazca booby nestlings experience a one-two hormonal punch, raising their aggression hormones even higher when they actually have a nest mate. The nestlings that fight siblings become bigger bullies as adults than the Nazca booby nestlings who never fight.

"The hormones that are part of this epic battle early in life seem to

permanently change some aspects of their social personality," Anderson said.

Nazca booby chicks have aggression-related hormone levels three times as high as their less aggressive cousins, the blue-footed boobies. Blue-footed boobies do not have the same lethal fights right after hatching and do not go on to bully their fellow birds as adults.

Source: Wake Forest University